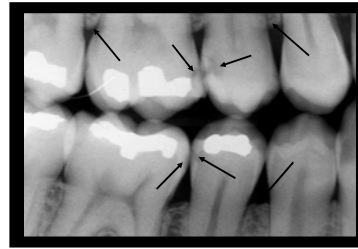


Intraoral Film

Bitewing
Periapical
Occlusal

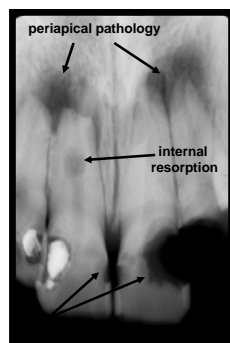
Bitewing Film



Interproximal Caries
Alveolar Bone Involvement

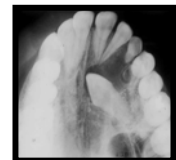
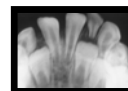
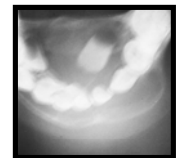
Periapical Film

Apical pathology
Periodontal evaluation
Caries detection
Endodontic treatment



Occlusal Film

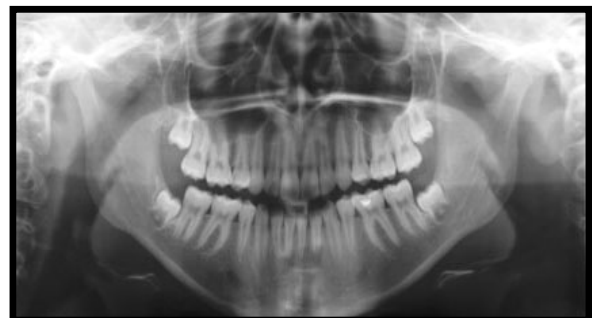
Identify large lesions
Locate bucco-lingually
Developing anterior teeth
Imaging trismus patients



Extraoral Film

Panoramic
Lateral Jaw
Skull films
Cephalometric
TMJ

Panoramic Film



Lateral Jaw Film



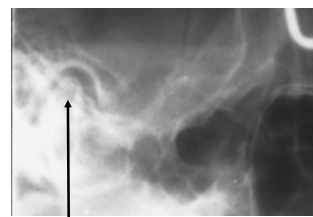
Skull Film



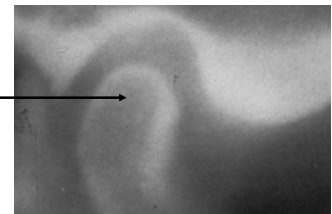
Cephalometric Film



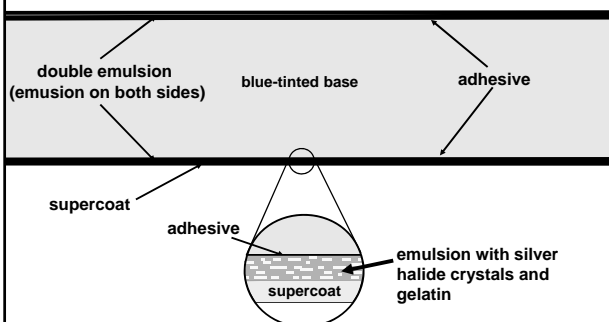
TMJ Films



condyle



Film Composition



tabular

globular



← top →



← side →

Tabular (flat) crystals with F-speed film (Insight)

Globular (rounded) crystals with D-speed film (Ultraspeed)

Film Types

Direct exposure film

Screen film

Direct Exposure Film

- Sensitive to x-rays
- Used intraorally

Screen Film

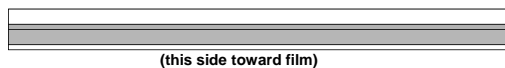
- Sensitive to light
- Used with intensifying screens
- Used extraorally

Intensifying Screen Function

Converts x-ray energy into light energy (fluorescence); light then exposes film

Screen/film combination uses 30-60 times less radiation than direct exposure film

Intensifying Screen Composition



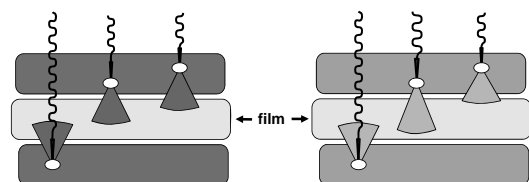
Base (thick white line) = plastic for support

Reflecting layer (silver line) = reflects light back toward film

Phosphor layer (green line) = rare earth (¹⁰)

Protecting coat (thin white line) = plastic

Light Emission



○ = phosphor crystal

Intensifying Screen Speed

Fast (Rapid): less exposure, less detail

Medium (Par): compromise between speed and detail

Slow (Fine, Detail): more detail, more exposure

Screen speed increased by:

Higher absorption phosphor (rare earth)

Higher conversion-efficiency phosphor (rare earth)

Thicker phosphor layer (all)

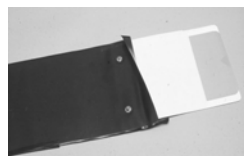
Cassettes

Hold intensifying screens (2) in tight contact with film



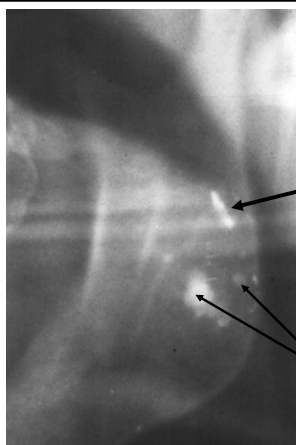
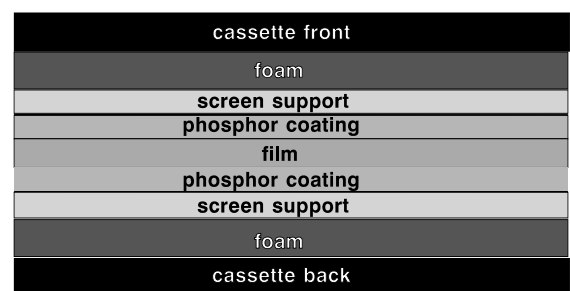
Rigid metal cassette

Rigid (metal) or soft (vinyl)



Flexible vinyl cassette

Rigid Cassette



Any debris in the cassette (between the screen and film) will result in a white spot on the film

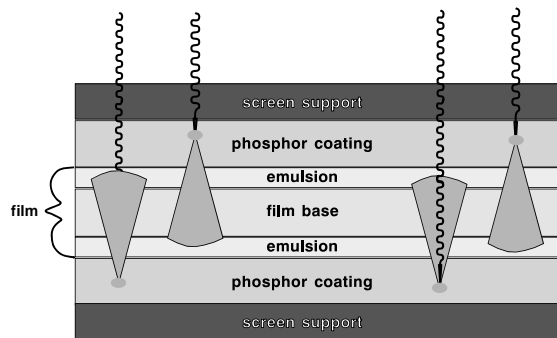
tonsillar calcifications

Types of Screen Film

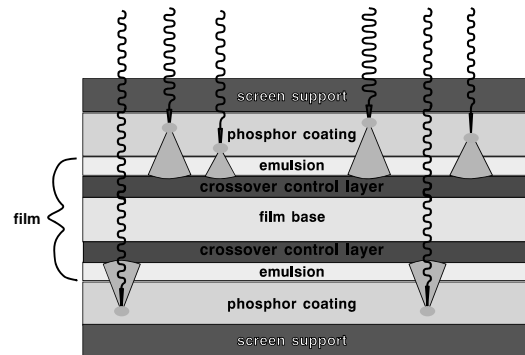
T- Mat: green-sensitive; used with rare-earth screens. Flat crystals

Ektavision: green-sensitive; used with rare earth screens. Anti-crossover layer gives sharper image. Flat crystals.

T-Mat (crossover)



Ektavision (anti-crossover)



Film Choices:

G: used for best contrast

L: most forgiving; normally used

H: used for extra copy of film

Film Sizes (Intraoral)

0: Children (PA & BW); small mouths

1: Adult anterior (PA): paralleling

2: Adult anterior PA (Bisecting); adult posterior PA & BW; pedo occlusal

3: Extra long BW

4: Adult Occlusal

#2

#3

#1

#4

#0

Film Sizes (Extraoral)

5" x 12" – panoramic

6" x 12" – panoramic

5" x 7" – Transcranial, lateral oblique jaw

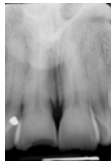
8" x 10" – Skull, ceph, Tomogram

Speed

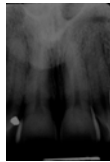
Represents the amount of radiation required to produce a radiograph of acceptable density. Film speed increased with larger silver halide crystals.



Too light



Proper density



Too dark

INTRAORAL FILM SPEED

D-speed (Ultraspeed)

Globular crystals

F-speed (Insight)

Largest silver halide crystals

Tabular crystals (flat)

60% less exposure than D-speed

Extraoral Film/Screen System

$$\begin{array}{c} \text{Film speed} \\ + \\ \text{Screen speed} \end{array} = \text{System Speed}$$

Larger silver halide crystals increase film speed.

Clinasept barrier packets

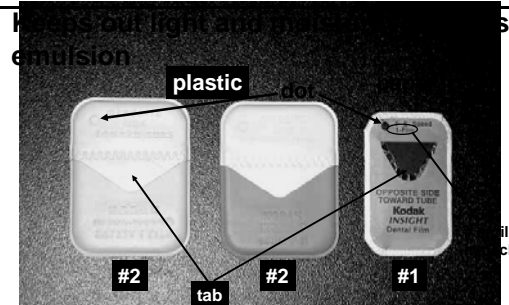


front



back

Film cover

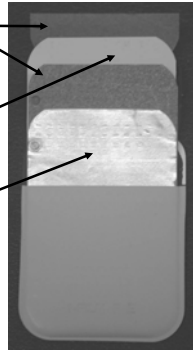


Contents of Film Packet

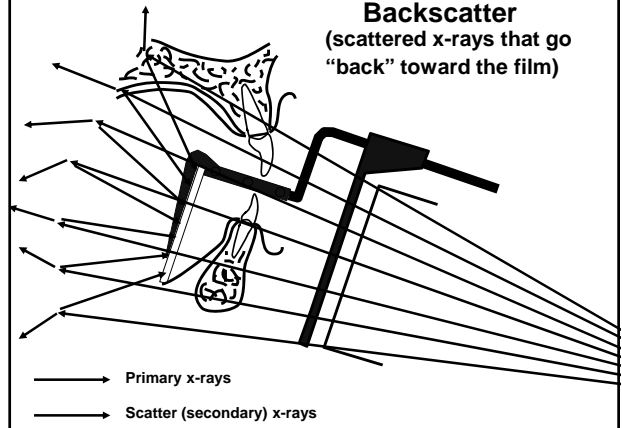
Black paper: surrounds film; protects emulsion.

Film: one or two films; raised dot in one corner used for film orientation.

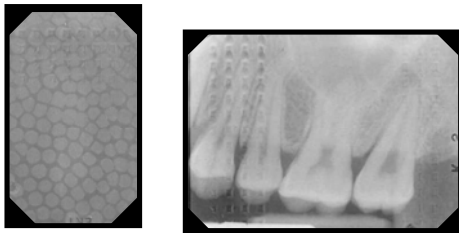
Lead foil: protects film from backscatter (see next slide); reduces patient exposure; strengthens packet; pattern on foil identifies when film is placed backwards (back of film faces teeth).



Backscatter
(scattered x-rays that go "back" toward the film)



Reversed Films



Film Storage

- Store at 50 – 70 degrees F (refrigerated). Storage at high temperatures may result in film fogging.
- Opened boxes of screen (extraoral) film need to be kept in light-tight area (darkroom); need to be cool.
- Use film before expiration date to avoid film fogging.
- Do not store film in room where radiographs are taken

**10-MINUTE
BREAK**

PROCESSING

Darkroom

Light-tight

Hot/cold water (mixer)

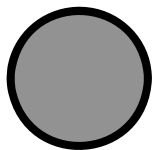
Clean

Adequate size

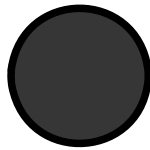
Safelight



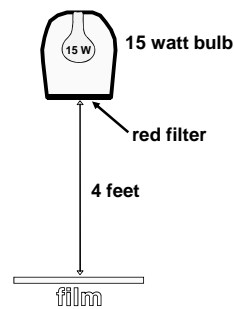
Safelight Filters



Morlite
D-speed

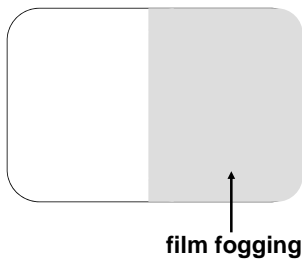


GBX-2
Intraoral,
Extraoral
(all films)

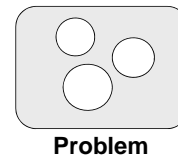


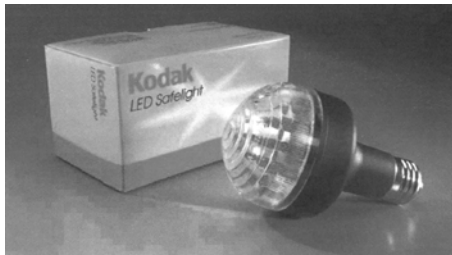
The safelight should have a 15-watt bulb (older style safelight) and be mounted to the wall or ceiling at least 4 feet from the area where the films are unwrapped and loaded into the film processor.

Improper safelighting, light leak



Safelight Test





KODAK LED Safelight

© Eastman Kodak Company

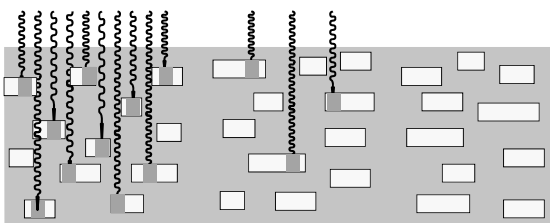
Twice as much light

Latent Image

Pattern formed by the interaction of x-rays or light with the silver halide crystals in the emulsion. Development centers created.

Latent Image

Air/soft tissue	Bone	Amalgam/gold
Many x-rays penetrate and expose many silver halide crystals	Fewer x-rays penetrate and not as many silver halide crystals are exposed	Few, if any, x-rays penetrate; silver halide crystals not exposed

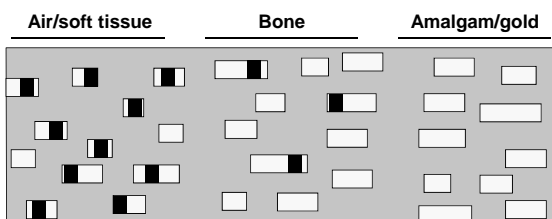


Basic Steps of Processing

Develop
Rinse (Manual)
Fix
Wash
Dry

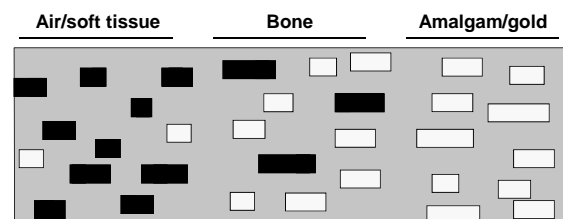
Developing

Development centers converted to black metallic silver



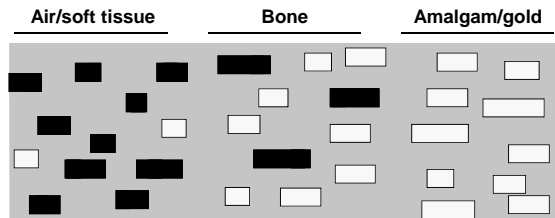
Developing (continued)

Entire crystal converted to black metallic silver



Fixing

Unexposed crystals removed
from film



Developing Solution

Developer

Preservative

Activator

Restrainer

Developer

Converts exposed silver
halide crystals into black
metallic silver grains

Preservative

Helps prevent developer from
being oxidized by the air

Activator

Provides alkaline solution
needed by developer; softens
gelatin, allowing developer to
reach crystals

Restrainer

Slows down rate of
development of
unexposed crystals

Fixing Solution

Clearing Agent
Acidifier
Preservative
Hardener

Clearing Agent

**Dissolves and removes
unexposed silver halide
crystals from emulsion**

Acidifier

**Neutralizes any
contaminating alkali
from the developer**

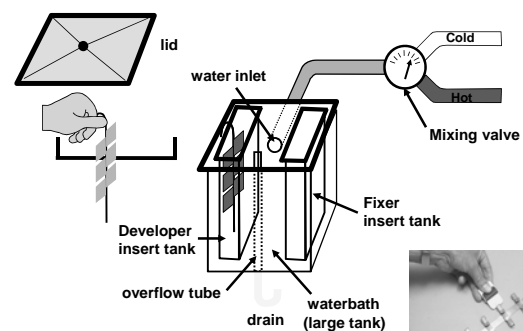
Preservative

**Inhibits decomposition
(oxidation) of clearing agent**

Hardener

**Hardens emulsion so film
can be handled**

Manual Processing



Manual Processing

Check solution levels

Stir solutions frequently

Check temperature often

Replenish 8 ounces daily (up to 30 films; add 1 oz. per 4 films over 30)

Manual Processing Times

Develop 5 minutes (20 degrees)

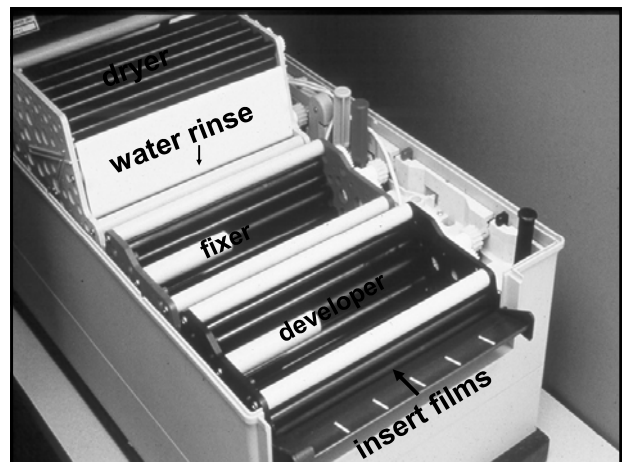
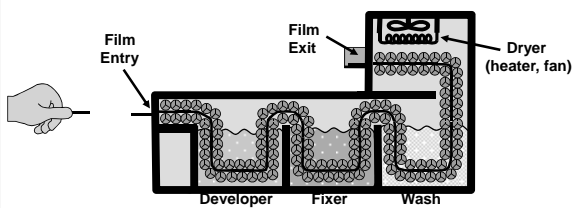
Rinse 30 seconds
(agitate continuously)

Fix 4 minutes
(agitate intermittently, 5/30)

Wash 10 minutes in clean
running water

Hang films to dry

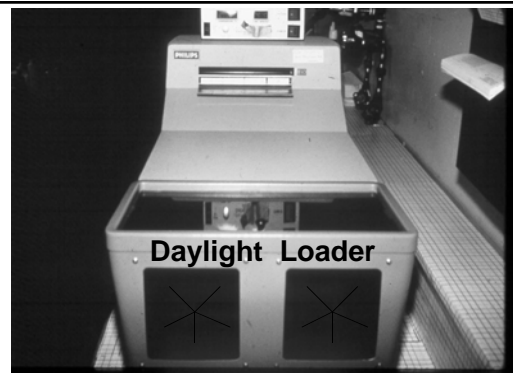
Automatic Processor



Automatic Processing

Developer (28° C)

Replenish 8 ounces daily
(up to 30 films; add 1 oz.
per 4 films over 30)



Intraoral films only
Must be placed in an area of subdued lighting

Use Roller Transport Clean-up Film daily to clean rollers before processing films

Clean automatic processors at every solution change (every 2 to 4 weeks)

Clean rollers with warm water/soft brush

Processing Errors



too dark



correct density



too light

Dark Film

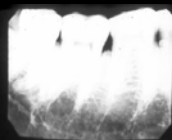
Solutions too warm

Too much time in developer

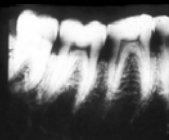
Developer concentration too high

Light leaks; incorrect filters

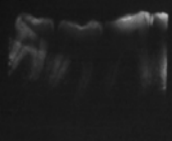
5 minutes



20°C



27°C

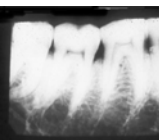


32°C

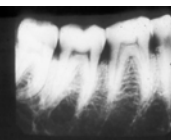


35°C

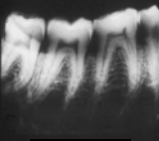
20° C



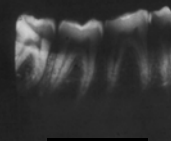
5 min.



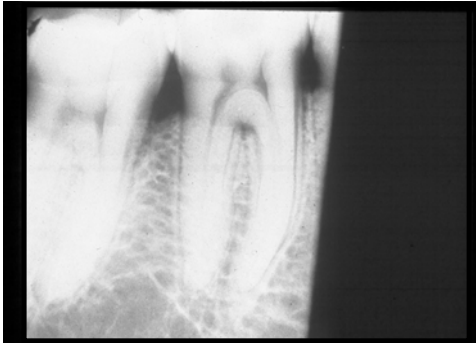
10 min.



15 min.

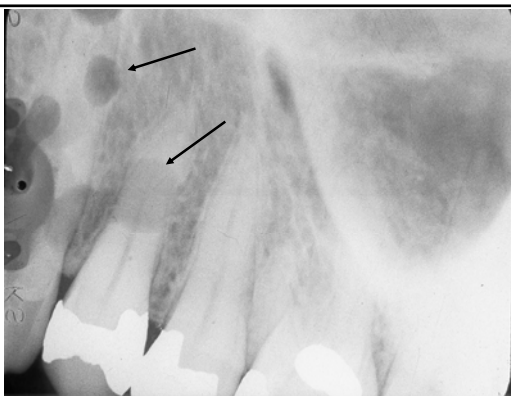


20 min.

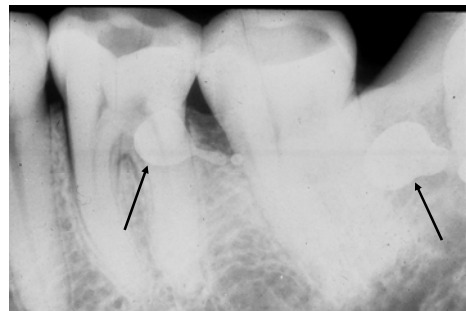


Light Film

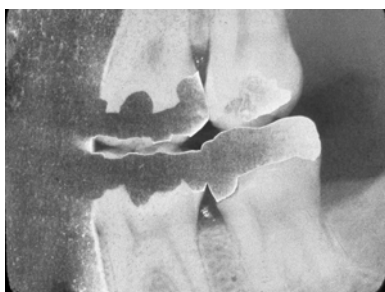
Solutions too cool
Short development time
Under-replenishment
Contaminated developer
Excessive fixation



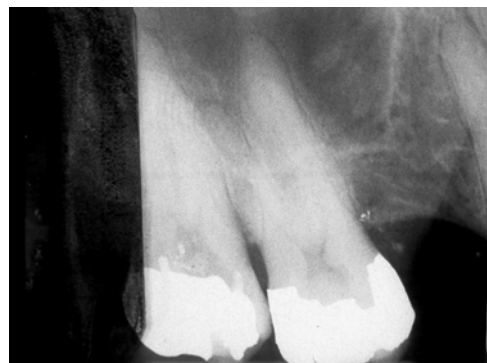
Dark spots – developer contamination



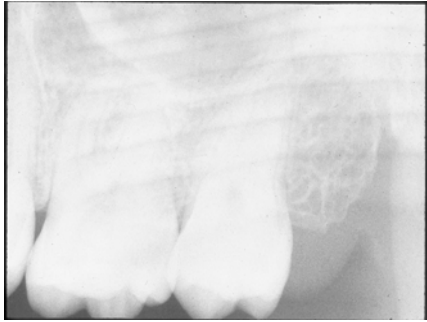
White spots – fixer contamination or air bubble



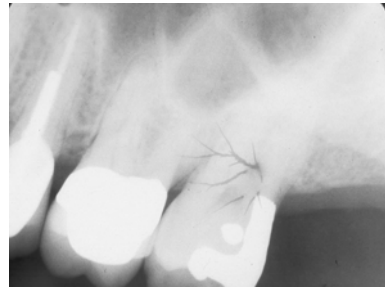
Yellow/brown stain
Inadequate wash, depleted fixer



Films overlapped during processing



Dirty rollers



Static electricity



Static electricity